arts. Comparisons with New England. Influence of occupations on institutions. Growth of colony.

Kind of country found by French colonists. Character of colonists, and history of settlement. Appearance of a typical colony. Occupations developed. Houses, home life, and industrial arts. Social life and government. Comparisons with New England and Virginia.

The New England town-meeting. Its origin and history. Its influence. Spread of colonies, and beginning of the representative system. The old Virginia county. Colonial legislatures.

Conditions in England which led to settlements in America. Industrial changes in England. Origin and growth of the representative system. Comparisons with Oriental, Greek, and Roman types of government. Effects of English ideas of government upon English colonies.

The government of France in the Old Régime. Causes which led to colonization. Character of colonists. Influence of country upon occupations and institutions. The French in the Mississippi Valley.

Differences between the French and English colonies in extent of territory, population, religion, relation with the Indians, military strength, and government. Causes of conflict between them. The Seven Years War. Relation of geography to conflict. Frontier lines.

References: *English Colonies in America*, Doyle. *English Colonies in America*, Lodge. *Beginnings of New England*, Fiske. *Old Virginia and Her Neighbors*, Fiske. Parkman's works. *Civil Government*, Fiske. *American Political Ideas*, Fiske. *American History To d by Contemporaries*, Hart.

Industrial Development of the Nation. Causes of struggle with England. Literature of the Revolution. The study of wars in history. Geographical basis of study of wars. Meaning of "Critical Period." The Federal Convention.

Early relation to foreign powers. Gradual gaining of independence. The westward movement of people. Routes of travel. Effects of geography. Frontier lines. Influences which have tended to strengthen the Union.

Inventions and their influence. Belated industries and regions. Present industrial condition. Relation of industries to institutions. Relation of institutions to development of literature and art. National problems.

References: *History of the United States.* McMaster. *History of the United States*, Schouler. *History of the United States*, Henry Adams. *The Critical Period*, Fiske. *Rise of the Republic*, Frothingham. *Influence of the Frontier*, in *Herbert Year Book*, 1899.

Geography

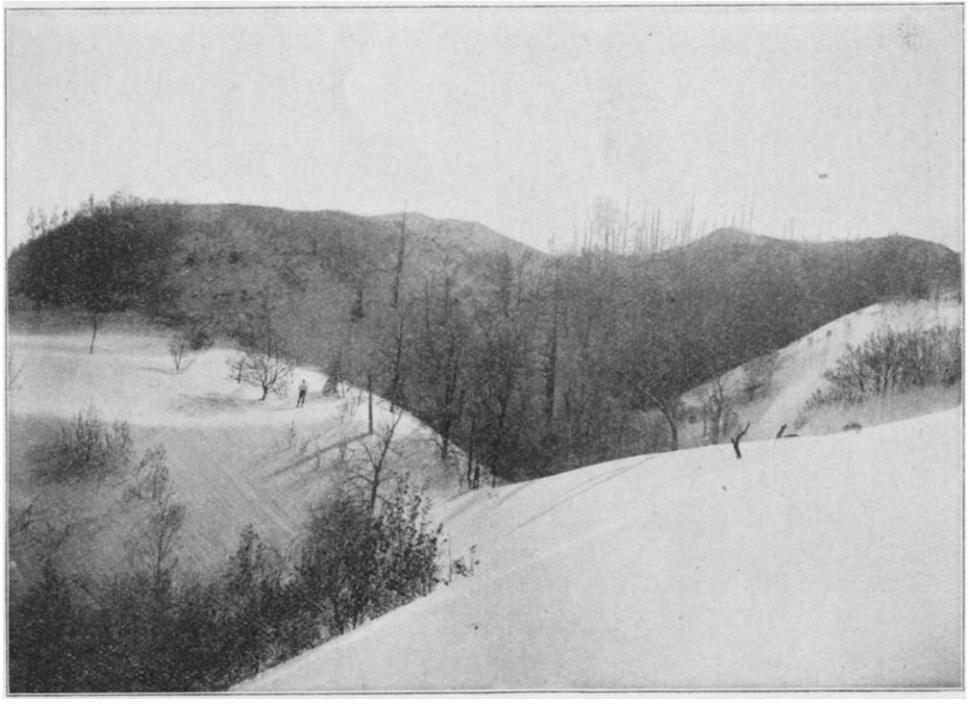
Zonia Baber Wallace W. Atwood

The work of this department in the Summer School has been so planned that two great ideas, prominent in modern geographic thought, may be emphasized. One of these ideas deals with the influence of geographic environment upon man; the other with the evolution or continual change of that environment. A full and sympathic appreciation of our natural surroundings cannot be attained without a knowledge of their history and an understanding of their influence upon the settlement and development of the region.

In the *Study of the Continents and Islands* it is proposed to give a broad, comprehensive view of the great land masses of the earth, picturing the chief physical features of each and showing how these physical features together with the climatic conditions influence the settlement and development of the different geographic provinces of each continent.

Throughout the work of this course, sand and chalk modeling will be illustrated, and their use in the teaching of geography shown. The political and commercial phases of geographic work will also receive due consideration.

The study of *Geographic Processes* will deal with the changes which land-forms are continually undergoing. These changes will, so far as possible, be studied in the



THE DUNES AT DUNE PARK, INDIANA.

field, and the indoor work developed from actual observations made by the class.

The region about Chicago offers many unusually good opportunities for field work, and frequent excursions from the city will be made.

At Winnetka and Glencoe, the origin and growth of gullies, and all the processes associated with valley development, may be studied. Along the west shore of Lake Michigan, north of the city, the action of the waves and the resulting shore line forms are illustrated, while bordering the great Chicago flat are the ancient shore lines of "Lake Chicago." At the south end of Lake Michigan, in northern Indiana, dunes have been developed on a magnificent scale; the Pleistocene or glacial drift formation, including terminal and ground moraines, is within easy reach; while the underlying rock formation of the region is well shown along the drainage canal, in the numerous quarries about the city, and at "Stony Island."

It is the aim also in working out with the class the geography and geology of the Chicago region, to make each student familiar with the methods of field work and field teaching, so that afterwards any local field may serve as a basis of instruction.

OUTLINE OF FIELD GEOGRAPHY.

I. Field Studied — Winnetka-Glencoe regions.

Special Topics—Weathering and erosion by running water, including the soil-making processes; the different kinds of soil; the origin and growth of a gully: securing of a permanent stream; work of stream in eroding, transporting, and depositing; valley-forms in youth, maturity, and old age; general topographic effect of valley development; land-forms resulting from stream deposition.

II. Field Studied—Shores of Lake Michigan.

Special Topics—The work of waves, winds, and littoral currents, including origin and nature of waves; erosion by waves; explanation of the lake cliff; depositional forms along the shores, i. e., bars, hooks, spit, etc.; ancient shore lines about Chicago; development of dunes; relation of vegetation to origin and growth of dunes; influence of dunes on vegetation; explanation of the great dune region at south end of Lake Michigan; dune topography, and migration of dunes.

III. Field Studied—Stony Island, Drainage Canal, and Quarries.

Special Topics—The underlying geographical formation, including origin of underlying formations; structure and history of Stony Island, and influence of geological structure on topographic forms.

IV. Field Studied — Purington and Barrington.

Special Topics—Glaciers, glacial work, and glacial formation, including types of glaciers; formation and movement of glaciers; erosion, transportation, and deposition by glaciers; forms of glacial drifts; i. e., terminal moraines, ground moraines, drumlins, eskars, valley trains, outwashed plains, etc.; their recognition and classification.

References: *Geography of Chicago and Its Environs*, Bulletin No. 1, Geographic Society of Chicago, Salisbury & Alden. Gilbert's *Henry Mountains*, Washington, D. C. *The Œcological Relations of the Vegetation of the Sand Dunes of Lake Michigan*, University of Chicago, Dr. Cowles. *An Introduction to Geography*, Scott. *The Drift*, Salisbury, *Journal of Geology*, Vol. II. *Shoreline Topography*, Gulliver. *Geography of the Devil's Lake Region*, Salisbury and Atwood.

Outline of Continental Geography

I. North America.

1. Appearance. (a) Extent. (b) Shape. (c) General Topography.

2. Eastern and Western highlands. (a) Great central plain. (b) Special topography.

3. Glaciated regions. (a) Mountainous regions. (b) Plateaus. (c) Plains, coastal; river, flood. (d) River basins. (e) Climate.

4. Wind. (a) Temperature. (b) Moisture. (c) Vegetation.

5. Forests. (a) Prairie. (b) Western plains. (c) Deserts. (d) Animals—wild, domestic.

6. Relation to surface and climate. (a) People. (b) Political divisions.

7. In country. (a) Industries. (b) How promote progress of civilization. (c) Influence of country life on people.

8. In cities. (a) Location—why? (b) Future growth—why? (c) Commercial. (d) Political. (e) Industries. (f) Influence of cities on human progress. (g) Influence of city life on the individual.

9. Educational institutions. (a) Political institutions. (b) Exports, imports, highways.

10. General view of evolution of North America. How introduce a continent? Pupils' use of modes of expression, sand modeling, chalk modeling, drawing, painting, etc. Use of weather maps, crop bulletins.

References: Stanford, *Compendium of North America.* Reclus, *Bird's-Eye View of World.* Reclus, *Earth and Its Inhabitants, North America.* Longman, *School Geography.* Longman, *Physical School Atlas.* Davis, *Physical Geography.* Shaler, *Our Continent.* Farr's *Physiography.* Shaler, *Nature and Man in America. Encyclopedias. U. S. Geological Surveys,* from 4th to 12th, inclusive. Whitney. *United States.*

II. Comparison of North America with South America, Eurasia, Africa, Australia.

1. Size; shape. (a) General plan of continents. (b) Topography, mountains, plains, etc. (c) Simple drainage slopes. (d) Special drainage areas. (e) Climate. (f) Vegetation. (g) People.

2. Distribution in relation to topography. (a) Industries. (b) Highways—natural; made by man. (c) Cities. (d) State of civilization of people—cause. (e) Our relation to other nations.

References: Mill, *International Geography.* Stanford, *Compendiums of Continents, South America, Eurasia.* Reclus, *Earth and Its Inhabitants.* Reclus, *Bird's-Eye View of World.* Mill, *Realm of Nature. Encyclopedias.*

III. Islands of the World.

1. Distribution. 2. Formation. (a) Continental—location. (b) Oceanic.

1. Volcanic—location. 2. Coral—location. 3. Surface. 4. Climate. 5. Products. 6. People. 7. Present interest in islands. Relation to commerce. Division of control of islands among great nations. 8. Special attenton to Hawaii, Philippines, West Indies.

References:

Islands—Reclus, *New Physical Geography, The Ocean.* Reclus, *Oceanica.* Stanford, *Australasia. Philippines*—Same as above, also Reclus. *Earth and Its Inhabitants. National Geographical Magazine,* '98. Reclus, *Bird's-Eye View of the World. Forum,* July, '98. *Current Literature,* October, '98. *North American Review,* September, '98. *Britannica*—See Index.

Hawaii—

Dutton, *Hawaiian Volcanoes.* United States Geological Survey, Fourth Annual Report, 1882-8. Wallace, *Island Life.* Alexander, *Islands of the Pacific.* Dana, *Characteristic Volcanoes.* Mrs. J. S. Bishop, *Hawaiian Archipelago.* Maxwell, *Lavas and Soils of Hawaii.*

Cuba and West Indies—

C. Hill, *Geology of Cuba.* Bulletin, Vol. XVI., No. 15, of Museum of Com. Zo., Cambridge. *National Geographical Magazine,* May, '98. Reclus, *North America. The Earth and Its Inhabitants.* Stanford, *Compendium—North America.* Reclus, *Bird's-Eye View of the World. Britannica*—See Index.

IV. Distribution of Sunshine.

1. Change of place and time of sunrise and sunset here—cause. 2. Cause of variation of length of day. 3. Meridianal movement of sun. 4. Relation of change of the angle of sun's rays to the seasons. 5. Effect of change of length of day at different places on earth. A knowledge of mathematical geography an essential in imaging continental landscapes.

References: Jackson, *Astronomical Geography.* Newcomb, *Popular Astronomy.* Huxley, *Physiography.* Gregory, *Elements of Physiography.*

V. Winds and Ocean Currents.

1. Winds of this region. (a) Direction—relation to barometric pressure. (b) Temperature. (c) Velocity. 2. Study of weather maps of U. S. (a) High areas. Low areas of pressure. (b) Isotherms. 3. Terrestrial winds. (a) Trade; counter trade; polar; monsoons. (1) Direction—constant or variable—cause? (2) Temperature. (3) Moisture. (4) Relation of winds to topography. (5) Relation to distribution of life. (6) Relation to man. 4. Ocean currents. (a) Location; movement; temperature; density. Effect on continents. Relation to life distribution—cause?

References: Davis, *Elementary Meteorology.* Davis, *Physical Geography.* Ferrell, *Popular Treatise on the Winds.* Waldo, *Elementary Meteorology.* Geikie, *Physical Geography.* Mills, *Realm of Nature.* Archibald, *The Story of the Atmosphere.* Gregory, *Elements of Physiography.*

VI. Distribution of Man. Relation of History to Geography.

1. Effect of structure and climate on man's development. 2. Growth of civilization in hot, temperate, and cold countries. 3. Relation of mountains to the early development of man. 4. Relation of protected river valley, of islands, to early civilization. 5. Value of forest regions; of prairie regions to man's development. 6. Regions of earth's surface best adapted to early development of civilization. 7. Present geographical distribution of man according to advancement. 8. Location of white, yellow, and black types. 9. Distribution of tribal governments, of monarchies, of republics. 10. Conditions for the development of a republican form of government.

References: Herbertson, *Man and His Work; an Introduction to Human Geography.*

Syllabi on Applied Mathematics

George W. Myers

It is a matter of common observation and the occasion of no little concern to schoolmen that the brightest mathematical students, when trained exclusively by text-book methods, are powerless to apply their mathematical knowledge to practical affairs. So soon as meaning is attached to symbols many expert mathematicians, indeed, are thrown into hopeless confusion. The foes of mathematical study in the schools have no difficulty, therefore, in finding an abundance of examples to substantiate their contention that mathematics is the most useless of all studies. It is believed that this deplorable condition has been brought about largely by the friends of mathematical study in aiding, by practice if not by precept, in the isolation of mathematics from other subjects of study, thereby divorcing mathematics from its applications and treating it as so much pure logic.

No thoughtful scientist can desire for a moment to discredit the value of the work of the pure mathematician. The history of science shows too well how likely the results of the mathematical logician are to find important application in the realm of useful knowledge, and how great the service to science is which these applications sometimes render. The application of the theory of the conic section to the planetary orbits, after Kepler found these orbits to be conics, will suffice to show how the results of abstract mathematical research have advanced scientific knowledge farther at a single stride than centuries of patient observational inquiry has been able to do, before the discovery of the applicability of the theory. But this same history proves that mathematical advance has much more frequently been brought about by the solution of problems met in the pursuits of natural science than has the discovery of new possibilities of applying mathematics brought about scientific advance. Furthermore, comparatively few who study mathematics in the public schools ever become, or desire to become, mathematical experts in any high sense. Most persons study these branches in the hope that they will be of help in the mastery of other fields of mental activity. To these persons mathematical study is of value chiefly in defining and clarifying the ideas, and in organizing and relating the facts and phenomena of the physical world. It is thought, therefore, that the mathematical sciences will take on a newness of life by bringing the elementary stages of their study back to the original mooring, by presenting the foundation principles as means of revealing certain aspects of the world of physical phenomena.

But as all definite ideas must reach the